To: Kraemer, Stephen[Kraemer.Stephen@epa.gov]
Cc: Robin, George[Robin.George@epa.gov]
From: Robin, George
Sent: Fri 6/26/2015 6:34:48 PM
Subject: RE: ORD research on aquifer exemptions

Hi Steve and thanks for catching this,

I can understand Matt's and David's reluctance to pursue this effort at the level you are proposing – for which – amazingly, we have the capacity to perform(!).

Our review will probably require a level of modeling to be the responsibility of the state of Ca. and ultimately those operators whose situations make it so. So, would Region 9 have perhaps a basic modeling tool that would serve us sufficiently to "flag" such situations and provide level of justification to require a better examination by the state and operators?

There are multiple issues associated with Aquifer Exemptions (AE) – and even some of these involve hydraulic fracturing, for which Ca. will require …baseline monitoring for characterization. Do you have the latest on this baseline monitoring? Let me know.

But there is a basic AE issue that I have stressed with the state (until Michele Dermer became the Proj. Officer handling, coordinating this enormous task). That is "how large an areal extent should the AE be designated?" Initially, for the 1983 Primacy Delegation, it was obviously too small; even in those days it should have been. The "oil pools" (oil/water boundaries) were simply transposed and submitted for the petition. Later, the state wanted to include the "Administrative Boundaries" as the new boundaries for the situations that needed them to be extended. That posed a problem in that the Admin. Boundaries (arbitrary, full-section field boundaries) had virtually no association with the geological and reservoir parameters. Nevertheless, it is prudent to establish the AEs in this sweeping effort in a realistically practical, foresighted (even future technologies), yet conservative manner such that minor extensions of the AE boundaries are not expected to occur in the near future. That boundary for a particular reservoir is a technically demanding key point for establishing, justifying and evaluating for approval.

I don't know if this has much in common regarding your program proposal, but it might help you.

Additionally, we could discuss at your convenience.

George

George Robin (robin.george@epa.gov)

Engineer, Underground Injection Control

US EPA, Region IX *Phone (415) 972-3532*

75 Hawthorne St. *Fax (415) 947-3549*

Ground Water Office

Mail Code: WTR-3-2 (new)

San Francisco, CA 94105

From: Kraemer, Stephen
Sent: Friday, June 26, 2015 8:55 AM
To: Robin, George
Subject: ORD research on aquifer exemptions

Hi George,

Just wanted to let you know I have submitted a pre-proposal to the ORD Safe and Sustainable Water Research program to investigate the aquifer exemption issue:

"Computer modeling tool development and demonstration to assist EPA Regions in the evaluation of injections of brines (UIC Class II) and aquifer exemptions. The research will

explore the appropriate level of model complexity and solution type, ranging from semi-analytical to numerical. The conceptual geologic space will include multiple permeable layers separated by leaky layers, injections and pumping wells, presence of permeable fracture/faults and permeable abandoned wells. The transient advective flow field will also include particle tracking to evaluate the potential communication between the injection wells and the pumping wells. A case study with supporting data will be pursued in consultation with EPA Regions and EPA OGWDW. The injection of fresh water to contain coastal salt water intrusion may be a useful analog for model testing. Note that the technology may also be used for area of potential impact assessment for injections of CO_2 (UIC Class VI) and deep carbon geologic sequestration."

I have spoken to David Albright and Matt Small about the research using the California datasets. They were not especially optimistic, but today I learned CA well logs are going public.

Appreciate your feedback.

Steve

Stephen R. Kraemer, Ph.D, Research Hydrologist
US EPA National Exposure Research Laboratory

Ecosystems Research Division

960 College Station Road

Athens, GA 30605-2700

voice (706) 355-8340

fax (706) 355-8007

kraemer.stephen@epa.gov